

Assessment of Air Quality in the International Space Station (ISS) and Space Shuttle Based on Samples Returned aboard STS-110 (ISS-8A) in April 2002

The toxicological assessment of grab sample canisters (GSCs) returned aboard STS-110 is reported. Analytical methods have not changed from earlier reports, and surrogate standard recoveries from the GSCs were 77-121%, with one exception. Pressure tracking indicated no leaks in the canisters. Recoveries from lab and trip controls for formaldehyde analyses ranged from 87 to 96%.

The two general criteria used to assess air quality are the total-non-methane-volatile organic hydrocarbons (NMVOCs) and the total T-value (minus the CO₂ and formaldehyde contributions). Because of the inertness of Freon 218 (octafluoropropane, OFP), its contribution to the NMVOC is subtracted and tabulated separately. Control of atmospheric alcohols is important to the water recovery system engineers, hence total alcohols are also shown for each sample. Because formaldehyde is quantified from sorbent badges, its concentration is listed separately. These five indices of air quality are summarized below:

| Sample Location | Date | NMVOCs - OFP (mg/m ³) | OFP (mg/m ³) | T Value ^a (units) | Alcohols (mg/m ³) | Formaldehyde (mg/m ³) |
|------------------------------|----------|--------------------------------------|-----------------------------|---------------------------------|----------------------------------|--------------------------------------|
| Lab | 12/27/01 | 15 | 278 | 1.38 | 5.1 | 0.045 |
| FGB | 12/27/01 | 12 | 301 | 0.77 | 7.2 | ns ^b |
| SM | 12/27/01 | 8 | 265 | 0.61 | 4.7 | 0.022 |
| Lab | 1/22/02 | 9 | 173 | 0.57 | 6.5 | 0.044 |
| FGB | 1/22/02 | 7 | 187 | 0.62 | 4.2 | ns |
| SM | 1/22/02 | 9 | 220 | 0.89 | 4.2 | 0.034 |
| Lab (VOA comp) | 1/24/02 | 7 | 137 | 0.72 | 4.3 | ns |
| Airlock (Metox) ^c | 2/20/02 | 39 | 114 | 5.52 | 13.3 | ns |
| Airlock (Scrub) ^d | 2/22/02 | 15 | 112 | 1.45 | 4.7 | ns |
| Lab | 3/7/02 | 7 | 73 | 0.47 | 4.0 | 0.053^f |
| FGB | 3/7/02 | 12 | 79 | 0.93 | 3.8 | ns |
| SM | 3/7/02 | 6 | 73 | 0.38 | 3.9 | 0.030 ^f |
| Node1 (Metox) ^e | 4/2/02 | 6 | 79 | 0.34 | 3.3 | ns |
| Node1 (Metox) ^e | 4/2/02 | 9 | 70 | 0.82 | 3.2 | ns |
| Shuttle Preflight | 4/8/02 | <1 | 0 | 0.01 | 1.1 | ns |
| Shuttle Middeck | 4/18/02 | 8 | 14 | 0.45 | 4.9 | ns |
| Acceptable Guideline: | | <25 | 85000 | <1 | <10 | 0.050 |

^a Formaldehyde and CO₂ not included in T calculation.

^b ns = not sampled

^c Contingency sample taken because of strong odors from Metox regeneration

^d Sample taken after 30-hour TCCS scrub of U.S. segment

^e Samples taken before and during nominal Metox regeneration

^f Average of paired samples completed on 3/1/02 and 3/28/02

The table shows that the air quality in general was acceptable for crew respiration; however, during the February Metox regeneration the indices indicated unhealthy air (NMVOCs=39, T=5.52). The crew took refuge in the Russian segment, and the air was scrubbed to a T value of 1.45, of which 0.76 was due to the 3 methylcyclsiloxanes that cause respiratory system injury independently of any other toxic activity. Similarly, the Lab air sample from 12/27/01 showed a T value of 1.38, of which 0.84 was from the same methylcyclsiloxanes. Thus the T values of 1.45 and 1.38 indicate acceptable air quality when toxic groups are considered separately.

There is a trend of decreasing concentrations of OFP, suggesting gradual removal and no new leaks from the SM air conditioner. Formaldehyde levels were consistently higher in the Lab compared to the SM, suggesting local sources of formaldehyde in the Lab. Some of the Lab measurements exceed the acceptable guideline of 0.05 mg/m^3 , which was set to protect even individuals who are highly sensitive to formaldehyde. The sources of formaldehyde are being investigated.

Enclosures

1A: Analytical Results of STS-110 GSC Samples

1B: Analytical Results of 8A GSC Samples

2A: T Values of STS-110 GSC Samples

2B: T Values of 8A GSC Samples

TABLE 1A
ANALYTICAL RESULTS OF
STS-110 CONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | CONCENTRATION (mg/m3) | |
|-----------------------------------|---|--|
| | AA03322 S/N 1006 PREFLIGHT 4/8/02@12:00EST | AA03341 S/N 1078 MIDDECK MET 10/12:27 |
| TARGET COMPOUNDS (TO-14/POLAR)*** | | |
| FREON 12 | <0.05 | TRACE |
| CHLOROMETHANE | <0.05 | TRACE |
| FREON 114 | <0.05 | <0.05 |
| METHANOL | TRACE | 0.27 |
| ACETALDEHYDE | TRACE | 0.15 |
| VINYL CHLORIDE | <0.05 | <0.05 |
| BROMOMETHANE | <0.05 | <0.05 |
| ETHANOL | TRACE | 4.40 |
| CHLOROETHANE | <0.05 | <0.05 |
| ACETONITRILE | <0.05 | TRACE |
| PROPENAL | <0.02 | <0.02 |
| ACETONE | TRACE | 0.23 |
| PROPANAL | TRACE | TRACE |
| 2-PROPANOL | 0.13 | TRACE |
| FREON 11 | <0.05 | <0.05 |
| FURAN | <0.05 | <0.05 |
| ACRYLONITRILE | <0.05 | <0.05 |
| PENTANE | <0.05 | <0.05 |
| 2-METHYL-2-PROPANOL | <0.05 | TRACE |
| METHYL ACETATE | <0.05 | <0.05 |
| 1,1-DICHLOROETHENE | <0.05 | <0.05 |
| DICHLOROMETHANE | <0.05 | 0.40 |
| 3-CHLOROPROPENE | <0.05 | <0.05 |
| FREON 113 | <0.05 | <0.05 |
| N-PROPANOL | <0.05 | <0.05 |
| 1,1-DICHLOROETHANE | <0.05 | <0.05 |
| BUTANAL | <0.05 | TRACE |
| 2-BUTANONE | TRACE | TRACE |
| 1,2-DICHLOROETHENE | <0.05 | <0.05 |
| 2-METHYLFURAN | <0.05 | <0.05 |
| ETHYL ACETATE | <0.05 | TRACE |
| HEXANE | <0.05 | <0.05 |
| CHLOROFORM | <0.05 | <0.05 |
| 2-BUTENAL | <0.05 | <0.05 |
| 1,2-DICHLOROETHANE | <0.05 | <0.05 |
| 1,1,1-TRICHLOROETHANE | <0.05 | <0.05 |
| N-BUTANOL | TRACE | TRACE |
| BENZENE | <0.05 | <0.05 |
| CARBON TETRACHLORIDE | <0.05 | <0.05 |
| 2-PENTANONE | <0.05 | <0.05 |
| PENTANAL | <0.05 | TRACE |
| 1,2-DICHLOROPROPANE | <0.05 | <0.05 |
| 1,4-DIOXANE | <0.05 | <0.05 |
| TRICHLOROETHENE | <0.05 | <0.05 |
| 2,5-DIMETHYLFURAN | <0.05 | <0.05 |
| 4-METHYL-2-PENTANONE | <0.05 | <0.05 |
| CIS-1,3-DICHLOROPROPENE | <0.05 | <0.05 |
| 2-PENTENAL | <0.05 | <0.05 |
| TRANS-1,3-DICHLOROPROPENE | <0.05 | <0.05 |
| 1,1,2-TRICHLOROETHANE | <0.05 | <0.05 |
| TOLUENE | <0.05 | TRACE |
| HEXANAL | <0.05 | TRACE |
| MESITYL OXIDE | <0.05 | <0.05 |
| 1,2-DIBROMOETHANE | <0.05 | <0.05 |
| BUTYL ACETATE | <0.05 | <0.05 |
| TETRACHLOROETHENE | <0.05 | <0.05 |
| CHLOROBENZENE | <0.05 | <0.05 |
| ETHYL BENZENE | <0.05 | <0.05 |
| M- + P-XYLENES | <0.05 | <0.05 |
| 2-HEPTANONE | <0.05 | <0.05 |
| CYCLOHEXANONE | <0.05 | <0.05 |
| HEPTANAL | TRACE | TRACE |
| STYRENE | <0.05 | <0.05 |
| 1,1,2,2-TETRACHLOROETHANE | <0.05 | <0.05 |
| O-XYLENE | <0.05 | <0.05 |
| 1,3,5-TRIMETHYLBENZENE | <0.05 | <0.05 |
| 1,2,4-TRIMETHYLBENZENE | <0.05 | <0.05 |
| 1,3-DICHLOROBENZENE | <0.05 | <0.05 |
| 1,4-DICHLOROBENZENE | <0.05 | <0.05 |
| 1,2-DICHLOROBENZENE | <0.05 | <0.05 |
| 1,2,4-TRICHLOROBENZENE | <0.05 | <0.05 |
| HEXACHLORO-1,3-BUTADIENE | <0.05 | <0.05 |

TABLE 1A
ANALYTICAL RESULTS OF
STS-110 CONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | CONCENTRATION (mg/m3) | |
|----------------------|---|--|
| | AA03322 S/N 1006 PREFLIGHT 4/8/02@12:00EST | AA03341 S/N 1078 MIDDECK MET 10/12:27 |
| | | |

| | | |
|-----------------------------|-------|-------|
| TARGET COMPOUNDS (TOXIC) | | |
| 1,3-BUTADIENE | <0.05 | <0.05 |
| ETHYLENE OXIDE | <0.05 | <0.05 |
| CARBON DISULFIDE | <0.05 | <0.05 |
| 2-METHYL-2-PROPENAL | <0.05 | <0.05 |
| 3-BUTEN-2-ONE | <0.05 | <0.05 |
| DIMETHYLDISULFIDE | <0.05 | <0.05 |
| 2-ETHOXYETHANOL | <0.05 | <0.05 |
| OCTAMETHYLCYCLOTETRAILOXANE | TRACE | 0.10 |

| | | |
|--------------------------------|-------|-------|
| NON-TARGET COMPOUNDS | | |
| OCTAFLUOROPROPANE | 0.000 | 14 |
| BROMOTRIFLUOROMETHANE | BL | 0.298 |
| 1-PROPENE | BL | 0.003 |
| CARBONYL SULFIDE | BL | 0.000 |
| 2-METHYLPROPANE | BL | BL |
| FLUOROTRIMETHYLSILANE | BL | BL |
| 2-METHYL PROPANAL | BL | BL |
| TRIMETHYLSILANOL | BL | 0.006 |
| 2-METHYL 2-PROPENENITRILE | BL | BL |
| 1,3-DIOXOLANE | BL | 0.002 |
| 2-METHYLPROPANENITRILE | BL | BL |
| C7-ALKANE | BL | BL |
| C7-ALKANE | BL | BL |
| C7-ALKANE | BL | BL |
| C7-ALKANE | 0.001 | BL |
| C7-ALKANE | BL | 0.001 |
| UNKNOWN ALCOHOL | BL | BL |
| HEXAMETHYLDISILOXANE | BL | BL |
| C7-ALKANE | BL | BL |
| DIMETHYLCYCLOPENTANE ISOMER | BL | BL |
| PROPANOIC ACID, ETHYL ESTER | BL | BL |
| DIMETHYLCYCLOPENTANE ISOMER | BL | BL |
| ACETIC ACID, PROPYL ESTER | BL | BL |
| HEPTANE | BL | BL |
| FORMIC ACID, BUTYL ESTER | BL | BL |
| METHYLCYCLOHEXANE | BL | BL |
| C8-ALKANE | BL | BL |
| ETHYLCYCLOPENTANE | BL | BL |
| C8-ALKANE | BL | BL |
| C3-SUBSTITUTED CYCLOPENTANE | BL | BL |
| CARBONIC ACID, DIETHYL ESTER** | BL | BL |
| C8-ALKANE | BL | BL |
| C8-ALKANE | BL | BL |
| C8-ALKANE | BL | BL |
| PENTAMETHYLDISILOXANE-1-OL | BL | BL |
| C8-ALKANE | BL | BL |
| BUTANOIC ACID, ETHYL ESTER | BL | BL |
| OCTANE | BL | BL |
| C7-OXYGENATED HYDROCARBON | BL | BL |
| HEXAMETHYLCYCLOTETRAILOXANE | 0.081 | 0.163 |
| BENZALDEHYDE | 0.003 | 0.003 |
| A-PINENE | BL | 0.002 |
| C4-SUBSTITUTED BENZENE | BL | BL |
| LIMONENE | BL | 0.002 |
| DECAMETHYLCYCLOPENTASILOXANE | 0.015 | 1.442 |

| | | |
|-----------------------------|-----|-----|
| TOTAL ALCOHOLS PLUS ACETONE | 1.1 | 4.9 |
|-----------------------------|-----|-----|

| | | |
|--------------------------|------|------|
| TARGET COMPOUNDS (GC)*** | | |
| ETHYLENE | <0.6 | <0.6 |
| CARBON MONOXIDE | <1.1 | 3.6 |
| METHANE | 1.3 | 25 |
| HYDROGEN | <1.6 | 5.3 |
| CARBON DIOXIDE | 860 | 8300 |

| | | |
|---|------|------|
| TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS) | 0.46 | 22.0 |
|---|------|------|

< : Value is less than the laboratory report detection limit.

TRACE: Amount detected is sufficient for compound identification only. Calculations are based on one-half of the laboratory report detection limit (1.1 mg/m3 for CO; 0.2 mg/m3 for CH4; 1.6 mg/m3 for H2; 0.05 mg/m3 for VOCs; and 0.02 mg/m3 for propenal.)

BL: Area below the search routine limit (<20% of the fluorobenzene peak area).

***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.

NOTE: High levels (above 1.5ppm) of Methanol, Ethanol, Acetone, Isopropanol and 2-Butanone are routinely reported based on calibrated GC-FID measurements.

TABLE 1B
ANALYTICAL RESULTS OF
ISS 8A CONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | CONCENTRATION | | | | | | | | | | | | | | |
|-----------------------------------|--|--|--|--|--|---|--|--|--|--|--|---|---|---|--|
| | (mg/m3) | | | | | | | | | | | | | | |
| | AA03327 SN1019 Lab 12/27/2001 08:21GMT | AA03328 SN1062 FGB 12/27/2001 08:23GMT | AA03329 SN1049 Service Mod 12/27/2001 08:24GMT | AA03330 SN1025 Lab 01/22/2002 07:30GMT | AA03331 SN1051 FGB 01/22/2002 07:32GMT | AA03332 SN1047 Service Mod. 01/22/2002 07:34GMT | AA03333 SN1043 Lab 01/24/2002 09:15GMT | AA03334 SN1001 Airlock 02/20/2002 22:14GMT | AA03335 S/N 1016 Airlock 02/22/2002 07:28GMT | AA03336 SN1036 Lab 03/07/2002 12:28GMT | AA03337 SN1032 FGB 03/07/2002 12:29GMT | AA03338 SN1002 Service Mod. 03/07/2002 12:30GMT | AA03339 S/N 1073 Node 1 04/02/2002 10:37GMT | AA03340 S/N 1040 Node 1 04/02/2002 13:40GMT | |
| TARGET COMPOUNDS (TO-14/POLAR)*** | | | | | | | | | | | | | | | |
| FREON 12 | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| CHLOROMETHANE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| FREON 114 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| METHANOL | 0.63 | 0.58 | 0.71 | 0.85 | 0.90 | 0.86 | 0.88 | 0.72 | 0.78 | 0.69 | 0.70 | 0.69 | 0.51 | 0.29 | |
| ACETALDEHYDE | 0.20 | 0.20 | 0.21 | 0.18 | 0.16 | 0.21 | 0.14 | 0.66 | 0.13 | 0.15 | 0.19 | 0.20 | 0.17 | 0.16 | |
| VINYL CHLORIDE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| BROMOMETHANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| ETHANOL | 3.62 | 3.30 | 3.28 | 4.70 | 2.73 | 2.60 | 2.77 | 3.32 | 3.1 | 2.90 | 2.77 | 2.72 | 2.48 | 2.49 | |
| CHLOROETHANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| ACETONITRILE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| PROPENAL | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | TRACE | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | <0.02 | |
| ACETONE | 0.31 | 0.42 | 0.30 | 0.29 | 0.22 | 0.26 | 0.19 | 0.79 | 0.21 | 0.14 | 0.14 | 0.19 | 0.12 | 0.2 | |
| PROPANAL | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | 0.12 | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| 2-PROPANOL | 0.26 | 0.18 | 0.22 | 0.32 | 0.18 | 0.23 | 0.34 | 0.62 | 0.29 | 0.15 | 0.12 | 0.15 | 0.09 | 0.1 | |
| FREON 11 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | TRACE | TRACE | <0.05 | <0.05 | TRACE | TRACE | TRACE | |
| FURAN | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| ACRYLONITRILE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| PENTANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 2-METHYL-2-PROPANOL | TRACE | TRACE | TRACE | TRACE | <0.05 | TRACE | <0.05 | 0.22 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | |
| METHYL ACETATE | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 1,1-DICHLOROETHENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| DICHLOROMETHANE | 0.17 | 0.14 | 0.13 | 0.26 | 0.20 | 0.19 | 0.20 | 0.17 | 0.27 | 0.18 | 0.15 | 0.17 | 0.16 | 0.2 | |
| 3-CHLOROPROPENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| FREON 113 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | |
| N-PROPANOL | 0.07 | 1.84 | 0.06 | 0.09 | TRACE | 0.06 | TRACE | 0.41 | 0.05 | TRACE | TRACE | TRACE | TRACE | TRACE | |
| 1,1-DICHLOROETHANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| BUTANAL | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | 0.19 | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| 2-BUTANONE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | 0.12 | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| 1,2-DICHLOROETHENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 2-METHYLFURAN | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| ETHYL ACETATE | 0.06 | 0.06 | 0.06 | 0.05 | TRACE | TRACE | TRACE | 0.19 | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| HEXANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| CHLOROFORM | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 2-BUTENAL | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 1,2-DICHLOROETHANE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| 1,1,1-TRICHLOROETHANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| N-BUTANOL | 0.18 | 0.91 | 0.18 | 0.23 | 0.13 | 0.16 | 0.11 | 7.45 | 0.29 | 0.11 | 0.11 | 0.14 | 0.09 | 0.09 | |
| BENZENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.12 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | |
| CARBON TETRACHLORIDE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 2-PENTANONE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | TRACE | |
| PENTANAL | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | 0.10 | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | |
| 1,2-DICHLOROPROPANE | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | TRACE | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 1,4-DIOXANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| TRICHLOROETHENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 2,5-DIMETHYLFURAN | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 4-METHYL-2-PENTANONE | TRACE | TRACE | TRACE | TRACE | <0.05 | TRACE | <0.05 | 0.21 | TRACE | TRACE | <0.05 | <0.05 | <0.05 | TRACE | |
| CIS-1,3-DICHLOROPROPENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 2-PENTENAL | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| TRANS-1,3-DICHLOROPROPENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |
| 1,1,2-TRICHLOROETHANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | |

TABLE 1B
ANALYTICAL RESULTS OF
ISS 8A CONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | CONCENTRATION (mg/m3) | | | | | | | | | | | | | |
|-------------------------------|--|--|---|--|--|---|--|--|--|--|--|---|---|---|
| | AA03327 SN1019 Lab 12/27/2001 08:21GMT | AA03328 SN1062 FGB 12/27/2001 08:23GMT | AA03329 SN1049 Service Mod. 12/27/2001 08:24GMT | AA03330 SN1025 Lab 01/22/2002 07:30GMT | AA03331 SN1051 FGB 01/22/2002 07:32GMT | AA03332 SN1047 Service Mod. 01/22/2002 07:34GMT | AA03333 SN1043 Lab 01/24/2002 09:15GMT | AA03334 SN1001 Airlock 02/20/2002 22:14GMT | AA03335 S/N 1016 Airlock 02/22/2002 07:28GMT | AA03336 SN1036 Lab 03/07/2002 12:28GMT | AA03337 SN1032 FGB 03/07/2002 12:29GMT | AA03338 SN1002 Service Mod. 03/07/2002 12:30GMT | AA03339 S/N 1073 Node 1 04/02/2002 10:37GMT | AA03340 S/N 1040 Node 1 04/02/2002 13:40GMT |
| TOLUENE | 0.06 | 0.05 | 0.06 | 0.05 | TRACE | TRACE | TRACE | 3.05 | 0.13 | TRACE | TRACE | TRACE | TRACE | TRACE |
| HEXANAL | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE |
| MESITYL OXIDE | <0.05 | 0.10 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,2-DIBROMOETHANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| BUTYL ACETATE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | 0.72 | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE |
| TETRACHLOROETHENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | 0.15 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| CHLOROBENZENE | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | TRACE | <0.05 | 0.22 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| ETHYL BENZENE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | 0.34 | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE |
| M- + P-XYLENES | 0.05 | 0.06 | 0.06 | TRACE | TRACE | TRACE | TRACE | 1.33 | 0.06 | TRACE | TRACE | TRACE | TRACE | TRACE |
| 2-HEPTANONE | TRACE | <0.05 | TRACE | <0.05 | <0.05 | TRACE | <0.05 | TRACE | TRACE | TRACE | <0.05 | <0.05 | <0.05 | TRACE |
| CYCLOHEXANONE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE |
| HEPTANAL | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE | TRACE |
| STYRENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,1,2,2-TETRACHLOROETHANE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| O-XYLENE | 0.10 | 0.10 | 0.11 | 0.08 | 0.08 | 0.08 | 0.06 | 2.35 | 0.09 | TRACE | 0.06 | 0.07 | 0.24 | 0.23 |
| 1,3,5-TRIMETHYLBENZENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,2,4-TRIMETHYLBENZENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,3-DICHLOROBENZENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,4-DICHLOROBENZENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,2-DICHLOROBENZENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 1,2,4-TRICHLOROBENZENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| HEXACHLORO-1,3-BUTADIENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| TARGET COMPOUNDS (TOXIC) | | | | | | | | | | | | | | |
| 1,3-BUTADIENE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| ETHYLENE OXIDE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| CARBON DISULFIDE | TRACE | TRACE | TRACE | TRACE | <0.05 | <0.05 | TRACE | TRACE | TRACE | <0.05 | TRACE | <0.05 | TRACE | TRACE |
| 2-METHYL-2-PROPENAL | TRACE | TRACE | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | TRACE | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | TRACE |
| 3-BUTEN-2-ONE | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| 2-ETHOXYETHANOL | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| DIMETHYLDISULFIDE | TRACE | TRACE | TRACE | <0.05 | TRACE | TRACE | TRACE | TRACE | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 | <0.05 |
| OCTAMETHYLCYCLOTETRAISILOXANE | 3.75 | 2.05 | 0.51 | 0.33 | 0.28 | 1.47 | 0.59 | 2.88 | 3.99 | 0.52 | 3.33 | 0.35 | 0.2 | 1.32 |
| NON-TARGET COMPOUNDS | | | | | | | | | | | | | | |
| OCTAFLUOROPROPANE | 278 | 301 | 265 | 173 | 187 | 220 | 137 | 114 | 112 | 73 | 79 | 73 | 79 | 70 |
| BROMOTRIFLUOROMETHANE | 0.081 | 0.066 | 0.062 | 0.064 | 0.050 | 0.048 | 0.042 | 0.030 | 0.017 | BL | BL | BL | BL | BL |
| 1-PROPENE | 0.053 | 0.051 | 0.047 | 0.089 | 0.071 | 0.077 | 0.065 | 0.075 | 0.046 | 0.019 | 0.020 | 0.023 | 0.011 | 0.012 |
| CARBONYL SULFIDE | 0.002 | 0.002 | 0.002 | 0.002 | 0.001 | 0.002 | 0.002 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 |
| 2-METHYLPROPANE | 0.002 | 0.002 | BL | 0.003 | 0.003 | 0.002 | 0.002 | 0.098 | 0.015 | 0.002 | 0.001 | 0.001 | 0.013 | 0.766 |
| FLUOROTRIMETHYLSILANE | 0.026 | 0.015 | 0.013 | 0.026 | 0.015 | 0.012 | 0.021 | 0.647 | 0.043 | BL | BL | BL | BL | 0.045 |
| 2-METHYL PROPANAL | 0.001 | BL | BL | BL | BL | 0.002 | BL | 0.018 | 0.002 | BL | 0.001 | BL | BL | 0.002 |
| TRIMETHYLSILANOL | 0.162 | 0.091 | 0.088 | 0.140 | 0.067 | 0.071 | 0.111 | 0.299 | 0.162 | 0.099 | 0.057 | 0.053 | 0.087 | 0.111 |
| 2-METHYL 2-PROPENENITRILE | 0.002 | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.001 | 0.003 | 0.001 | BL | 0.001 | 0.001 | BL | 0.001 |
| 1,3-DIOXOLANE | 0.026 | 0.018 | 0.017 | 0.032 | 0.014 | 0.014 | 0.018 | 0.027 | 0.046 | 0.020 | 0.014 | 0.018 | 0.029 | 0.023 |
| 2-METHYLPROPANENITRILE | 0.008 | 0.006 | 0.006 | 0.006 | 0.005 | 0.005 | 0.004 | 0.011 | 0.004 | 0.003 | 0.003 | 0.004 | 0.004 | 0.004 |
| C7-ALKANE | 0.001 | 0.001 | BL | BL | BL | BL | BL | 0.051 | BL | BL | BL | BL | BL | BL |
| C7-ALKANE | 0.004 | 0.004 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.231 | 0.006 | BL | 0.001 | BL | BL | BL |
| C7-ALKANE | 0.018 | 0.017 | 0.017 | 0.013 | 0.010 | 0.013 | 0.009 | 0.732 | 0.031 | 0.008 | 0.006 | 0.008 | 0.005 | 0.013 |
| C7-ALKANE | 0.007 | 0.007 | 0.006 | 0.005 | 0.004 | 0.004 | 0.004 | 0.448 | 0.014 | 0.001 | 0.002 | 0.002 | 0.002 | 0.002 |
| C7-ALKANE | 0.018 | 0.016 | 0.015 | 0.012 | 0.009 | 0.010 | 0.008 | 0.910 | 0.032 | 0.004 | 0.004 | 0.005 | 0.004 | 0.006 |
| UNKNOWN ALCOHOL | 0.004 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.003 | 0.095 | 0.006 | 0.003 | 0.002 | 0.003 | 0.003 | 0.003 |

TABLE 1B
ANALYTICAL RESULTS OF
ISS 8A CONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | CONCENTRATION | | | | | | | | | | | | | |
|---|--|--|---|--|--|---|--|--|--|--|--|---|---|---|
| | (mg/m3) | | | | | | | | | | | | | |
| | AA03327 SN1019 Lab 12/27/2001 08:21GMT | AA03328 SN1062 FGB 12/27/2001 08:23GMT | AA03329 SN1049 Service Mod. 12/27/2001 08:24GMT | AA03330 SN1025 Lab 01/22/2002 07:30GMT | AA03331 SN1051 FGB 01/22/2002 07:32GMT | AA03332 SN1047 Service Mod. 01/22/2002 07:34GMT | AA03333 SN1043 Lab 01/24/2002 09:15GMT | AA03334 SN1001 Airlock 02/20/2002 22:14GMT | AA03335 S/N 1016 Airlock 02/22/2002 07:28GMT | AA03336 SN1036 Lab 03/07/2002 12:28GMT | AA03337 SN1032 FGB 03/07/2002 12:29GMT | AA03338 SN1002 Service Mod. 03/07/2002 12:30GMT | AA03339 S/N 1073 Node 1 04/02/2002 10:37GMT | AA03340 S/N 1040 Node 1 04/02/2002 13:40GMT |
| HEXAMETHYLDISILOXANE | 0.009 | 0.013 | BL | BL | BL | BL | BL | 0.301 | 0.010 | BL | BL | BL | BL | BL |
| C7-ALKANE | 0.004 | 0.004 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.315 | 0.009 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| DIMETHYLCYCLOPENTANE ISOMER | 0.001 | 0.001 | 0.000 | 0.000 | BL | BL | 0.000 | 0.043 | 0.001 | BL | BL | BL | 0.001 | BL |
| PROPANOIC ACID, ETHYL ESTER | 0.003 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.099 | 0.004 | BL | BL | BL | BL | BL |
| DIMETHYLCYCLOPENTANE ISOMER | 0.003 | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 | 0.001 | 0.130 | 0.004 | BL | BL | BL | BL | 0.001 |
| ACETIC ACID, PROPYL ESTER | 0.000 | 0.006 | BL | BL | BL | BL | BL | 0.069 | 0.003 | BL | BL | BL | BL | BL |
| HEPTANE | 0.013 | 0.012 | 0.011 | 0.007 | 0.005 | 0.006 | 0.005 | 0.749 | 0.023 | 0.002 | 0.002 | 0.003 | 0.002 | 0.004 |
| FORMIC ACID, BUTYL ESTER | BL | 0.004 | BL | BL | BL | BL | BL | 0.118 | 0.003 | BL | BL | BL | BL | BL |
| METHYLCYCLOHEXANE | 0.004 | 0.004 | 0.003 | 0.003 | 0.002 | 0.002 | 0.002 | 0.227 | 0.009 | BL | BL | 0.001 | 0.001 | 0.001 |
| C8-ALKANE | 0.001 | 0.001 | 0.001 | BL | BL | BL | BL | 0.058 | 0.001 | BL | BL | BL | BL | 0.001 |
| ETHYLCYCLOPENTANE | 0.001 | 0.001 | 0.001 | BL | BL | BL | BL | 0.063 | 0.002 | BL | BL | BL | BL | BL |
| C8-ALKANE | BL | BL | BL | BL | BL | BL | BL | 0.033 | 0.001 | BL | BL | BL | BL | BL |
| C3-SUBSTITUTED CYCLOPENTANE | BL | BL | BL | BL | BL | BL | BL | 0.044 | 0.001 | BL | BL | BL | BL | BL |
| CARBONIC ACID, DIETHYL ESTER** | 0.001 | 0.001 | 0.001 | 0.002 | 0.001 | 0.001 | 0.001 | 0.092 | 0.004 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| C8-ALKANE | 0.003 | 0.003 | 0.003 | 0.001 | 0.001 | 0.001 | 0.001 | 0.115 | 0.004 | 0.001 | 0.000 | 0.001 | 0.001 | 0.002 |
| C8-ALKANE | 0.002 | 0.002 | 0.002 | 0.001 | 0.001 | 0.001 | 0.001 | 0.078 | 0.002 | BL | BL | BL | 0.001 | 0.001 |
| C8-ALKANE | 0.004 | 0.003 | 0.003 | 0.002 | 0.001 | 0.001 | 0.001 | 0.154 | 0.004 | 0.000 | 0.000 | BL | 0.001 | 0.001 |
| PENTAMETHYLDISILOXANE-1-OL | 0.002 | BL | 0.001 | 0.004 | 0.002 | BL | 0.003 | 0.006 | 0.002 | 0.001 | 0.000 | 0.001 | 0.002 | BL |
| C8-ALKANE | 0.003 | 0.002 | 0.002 | 0.001 | 0.001 | BL | BL | 0.094 | 0.003 | BL | BL | BL | BL | BL |
| BUTANOIC ACID, ETHYL ESTER | 0.009 | 0.008 | 0.008 | 0.007 | 0.005 | 0.005 | 0.004 | 0.248 | 0.009 | 0.002 | 0.003 | 0.002 | 0.005 | 0.004 |
| OCTANE | 0.003 | 0.003 | 0.003 | 0.002 | 0.001 | 0.001 | 0.001 | 0.071 | 0.003 | 0.001 | 0.001 | 0.001 | 0.001 | 0.001 |
| C7-OXYGENATED HYDROCARBON | BL | BL | BL | BL | BL | BL | BL | 0.033 | 0.001 | BL | BL | BL | BL | BL |
| HEXAMETHYLCYCLOTRISILOXANE | 4.376 | 0.485 | 0.956 | 0.500 | 0.503 | 2.113 | 1.341 | 3.867 | 3.610 | 1.032 | 3.278 | 0.699 | 0.354 | 1.881 |
| BENZALDEHYDE | 0.013 | 0.012 | 0.014 | 0.007 | 0.007 | 0.012 | 0.007 | 0.184 | 0.013 | 0.008 | 0.010 | 0.009 | 0.006 | 0.009 |
| A-PINENE | 0.004 | 0.003 | 0.004 | 0.003 | 0.002 | 0.003 | 0.002 | 0.090 | 0.004 | 0.001 | 0.001 | 0.002 | 0.003 | 0.004 |
| C4-SUBSTITUTED BENZENE | 0.011 | 0.011 | 0.011 | 0.009 | 0.008 | 0.010 | 0.007 | 0.061 | 0.006 | 0.004 | 0.005 | 0.006 | 0.003 | 0.003 |
| LIMONENE | 0.011 | 0.010 | 0.009 | 0.042 | 0.045 | 0.054 | 0.024 | 0.154 | 0.022 | 0.038 | 0.032 | 0.038 | 0.013 | 0.013 |
| DECAMETHYLCYCLOPENTASILOXANE | 0.611 | 0.013 | 0.195 | 0.444 | 0.287 | 0.397 | 0.371 | 0.603 | 0.546 | 0.173 | 0.461 | 0.164 | 0.098 | 0.177 |
| TOTAL ALCOHOLS PLUS ACETONE | 5.1 | 7.2 | 4.7 | 6.5 | 4.2 | 4.2 | 4.3 | 13.3 | 4.7 | 4.0 | 3.8 | 3.9 | 3.3 | 3.2 |
| TARGET COMPOUNDS (GC)** | | | | | | | | | | | | | | |
| ETHYLENE | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 | TRACE | 1.1 | <0.6 | <0.6 | <0.6 | <0.6 | <0.6 |
| CARBON MONOXIDE | TRACE | <1.1 | <1.1 | TRACE | TRACE | <1.1 | <1.1 | 1.6 | TRACE | TRACE | <1.1 | <1.1 | TRACE | TRACE |
| METHANE | 57.0 | 57.0 | 57.0 | 150.0 | 150.0 | 150.0 | 150.0 | 240.0 | 120.0 | 18.0 | 20.0 | 20.0 | 14.0 | 14.0 |
| HYDROGEN | 4.4 | 4.2 | 4.3 | 4.7 | 4.8 | 4.9 | 4.8 | 2.7 | 1.0 | TRACE | TRACE | TRACE | TRACE | TRACE |
| CARBON DIOXIDE | 7500 | 6800 | 7400 | 7800 | 7300 | 7000 | 7600 | 14000 | 7800 | 8400 | 7500 | 8400 | 7300 | 8900 |
| TOTAL CONCENTRATION (NON-METHANE HYDROCARBONS) | 293.2 | 312.9 | 273.2 | 182.3 | 193.7 | 229.1 | 144.4 | 153.2 | 127.2 | 80.1 | 90.7 | 79.4 | 85 | 78.7 |

<: Value is less than the laboratory report detection limit.

TRACE: Amount detected is sufficient for compound identification only. Calculations are based on one-half

of the laboratory report detection limit (1.1 mg/m3 for CO; 0.2 mg/m3 for CH4; 1.6 mg/m3 for H2; 0.05 mg/m3 for VOCs; and 0.02 mg/m3 for propenal.)

BL: Area below the search routine limit (<20% of the fluorobenzene peak area).

***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing calibration.

NOTE: High levels (above 1.5ppm) of Methanol, Ethanol, Acetone, Isopropanol and 2-Butanol are routinely reported based on calibrated GC-FID measurements.

** TEMPORARY SMAC SET BY JOHN JAMES ON 4/26/02.

TABLE 2A
ANALYTICAL RESULTS OF
STS-110 CONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | T-VALUE (7-d SMAC) | |
|-----------------------------------|---|--|
| | AA03322 S/N 1006 PREFLIGHT 4/8/02@12:00EST | AA03341 S/N 1078 MIDDECK MET 10/12:27 |
| TARGET COMPOUNDS (TO-14/POLAR)*** | | |
| FREON 12 | ND | 0.00005 |
| CHLOROMETHANE | ND | 0.00061 |
| FREON 114 | ND | ND |
| METHANOL | 0.00278 | 0.02970 |
| ACETALDEHYDE | 0.00625 | 0.03640 |
| VINYL CHLORIDE | ND | ND |
| BROMOMETHANE | ND | ND |
| ETHANOL | 0.00001 | 0.00220 |
| CHLOROETHANE | ND | ND |
| ACETONITRILE | ND | 0.00373 |
| PROPENAL | ND | ND |
| ACETONE | 0.00048 | 0.00437 |
| PROPANAL | 0.00175 | 0.00175 |
| 2-PROPANOL | 0.00088 | 0.00017 |
| FREON 11 | ND | ND |
| FURAN | ND | ND |
| ACRYLONITRILE | ND | ND |
| PENTANE | ND | ND |
| 2-METHYL-2-PROPANOL | ND | 0.00017 |
| METHYL ACETATE | ND | ND |
| 1,1-DICHLOROETHENE | ND | ND |
| DICHLOROMETHANE | ND | 0.00803 |
| 3-CHLOROPROPENE | ND | ND |
| FREON 113 | ND | ND |
| N-PROPANOL | ND | ND |
| 1,1-DICHLOROETHANE | ND | ND |
| BUTANAL | ND | 0.00141 |
| 2-BUTANONE | 0.00083 | 0.00083 |
| 1,2-DICHLOROETHENE | ND | ND |
| 2-METHYLFURAN | ND | ND |
| ETHYL ACETATE | ND | 0.00014 |
| HEXANE | ND | ND |
| CHLOROFORM | ND | ND |
| 2-BUTENAL | ND | ND |
| 1,2-DICHLOROETHANE | ND | ND |
| 1,1,1-TRICHLOROETHANE | ND | ND |
| N-BUTANOL | 0.00031 | 0.00031 |
| BENZENE | ND | ND |
| CARBON TETRACHLORIDE | ND | ND |
| 2-PENTANONE | ND | ND |
| PENTANAL | ND | 0.00118 |
| 1,2-DICHLOROPROPANE | ND | ND |
| 1,4-DIOXANE | ND | ND |
| TRICHLOROETHENE | ND | ND |
| 2,5-DIMETHYLFURAN | ND | ND |
| 4-METHYL-2-PENTANONE | ND | ND |
| CIS-1,3-DICHLOROPROPENE | ND | ND |
| 2-PENTENAL | ND | ND |
| TRANS-1,3-DICHLOROPROPENE | ND | ND |
| 1,1,2-TRICHLOROETHANE | ND | ND |
| TOLUENE | ND | 0.00042 |
| HEXANAL | ND | 0.00101 |
| MESITYL OXIDE | ND | ND |
| 1,2-DIBROMOETHANE | ND | ND |
| BUTYL ACETATE | ND | ND |
| TETRACHLOROETHENE | ND | ND |
| CHLOROBENZENE | ND | ND |
| ETHYL BENZENE | ND | ND |
| M- + P-XYLENES | ND | ND |
| 2-HEPTANONE | ND | ND |
| CYCLOHEXANONE | ND | ND |
| HEPTANAL | 0.00089 | 0.00089 |
| STYRENE | ND | ND |
| 1,1,2,2-TETRACHLOROETHANE | ND | ND |
| O-XYLENE | ND | ND |
| 1,3,5-TRIMETHYLBENZENE | ND | ND |
| 1,2,4-TRIMETHYLBENZENE | ND | ND |
| 1,3-DICHLOROBENZENE | ND | ND |
| 1,4-DICHLOROBENZENE | ND | ND |
| 1,2-DICHLOROBENZENE | ND | ND |
| 1,2,4-TRICHLOROBENZENE | ND | ND |
| HEXACHLORO-1,3-BUTADIENE | ND | ND |

TABLE 2A
ANALYTICAL RESULTS OF
STS-110 CONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | T-VALUE (7-d SMAC) | |
|----------------------|---|--|
| | AA03322 S/N 1006 PREFLIGHT 4/8/02@12:00EST | AA03341 S/N 1078 MIDDECK MET 10/12:27 |

| TARGET COMPOUNDS (TOXIC) | | |
|-----------------------------|---------|---------|
| 1,3-BUTADIENE | ND | ND |
| ETHYLENE OXIDE | ND | ND |
| CARBON DISULFIDE | ND | ND |
| 2-METHYL-2-PROPENAL | ND | ND |
| 3-BUTEN-2-ONE | ND | ND |
| DIMETHYLDISULFIDE | ND | ND |
| 2-ETHOXYETHANOL | ND | ND |
| OCTAMETHYLCYCLOTETRAILOXANE | 0.00009 | 0.00035 |

| NON-TARGET COMPOUNDS | | |
|--------------------------------|---------|---------|
| OCTAFLUOROPROPANE | 0.00000 | 0.00017 |
| BROMOTRIFLUOROMETHANE | BL | 0.00003 |
| 1-PROPENE | BL | 0.00000 |
| CARBONYL SULFIDE | BL | 0.00004 |
| 2-METHYLPROPANE | BL | BL |
| FLUOROTRIMETHYLSILANE | BL | BL |
| 2-METHYL PROPANAL | BL | BL |
| TRIMETHYLSILANOL | BL | 0.00016 |
| 2-METHYL 2-PROPENENITRILE | BL | BL |
| 1,3-DIOXOLANE | BL | 0.00006 |
| 2-METHYLPROPANENITRILE | BL | BL |
| C7-ALKANE | BL | BL |
| C7-ALKANE | BL | BL |
| C7-ALKANE | BL | BL |
| C7-ALKANE | 0.00001 | BL |
| C7-ALKANE | BL | 0.00000 |
| UNKNOWN ALCOHOL | BL | BL |
| HEXAMETHYLDISILOXANE | BL | BL |
| C7-ALKANE | BL | BL |
| DIMETHYLCYCLOPENTANE ISOMER | BL | BL |
| PROPANOIC ACID, ETHYL ESTER | BL | BL |
| DIMETHYLCYCLOPENTANE ISOMER | BL | BL |
| ACETIC ACID, PROPYL ESTER | BL | BL |
| HEPTANE | BL | BL |
| FORMIC ACID, BUTYL ESTER | BL | BL |
| METHYLCYCLOHEXANE | BL | BL |
| C8-ALKANE | BL | BL |
| ETHYLCYCLOPENTANE | BL | BL |
| C8-ALKANE | BL | BL |
| C3-SUBSTITUTED CYCLOPENTANE | BL | BL |
| CARBONIC ACID, DIETHYL ESTER** | BL | BL |
| C8-ALKANE | BL | BL |
| C8-ALKANE | BL | BL |
| C8-ALKANE | BL | BL |
| PENTAMETHYLDISILOXANE-1-OL | BL | BL |
| C8-ALKANE | BL | BL |
| BUTANOIC ACID, ETHYL ESTER | BL | BL |
| OCTANE | BL | BL |
| C7-OXYGENATED HYDROCARBON | BL | BL |
| HEXAMETHYLCYCLOTETRAILOXANE | 0.00090 | 0.00181 |
| BENZALDEHYDE | 0.00002 | 0.00001 |
| A-PINENE | BL | 0.00001 |
| C4-SUBSTITUTED BENZENE | BL | BL |
| LIMONENE | BL | 0.00000 |
| DECAMETHYLCYCLOPENTASILOXANE | 0.00010 | 0.00962 |

| TARGET COMPOUNDS (GC)*** | | |
|--------------------------|---------|---------|
| ETHYLENE | ND | ND |
| CARBON MONOXIDE | ND | 0.32727 |
| METHANE | 0.00034 | 0.00658 |
| HYDROGEN | ND | 0.01559 |
| CARBON DIOXIDE | 0.06615 | 0.63846 |

| | | |
|---------------|---------|---------|
| TOTAL T-VALUE | 0.08179 | 1.09354 |
|---------------|---------|---------|

ND : Value is less than the laboratory report detection limit.

BL: Area below the search routine limit (< 20% of the fluorobenzene peak area).

Note: Number of decimal places in T-Values do not represent significant figures of measurements.

***Measurements are calibrated by multi-point initial calibration and verified by mid-point continuing

TABLE 2B
ANALYTICAL RESULTS OF
ISS SACONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | T-VALUE (180-d SMAC) | | | | | | | | | | | | | |
|-----------------------------------|--|--|---|--|--|---|--|--|--|---|---|--|--|--|
| | AA03327 SN1019 Lab 12/27/2001 08:21GMT | AA03328 SN1062 FGB 12/27/2001 08:23GMT | AA03329 SN1049 Service Mod. 12/27/2001 08:24GMT | AA03330 SN1025 Lab 01/22/2002 07:30GMT | AA03331 SN1051 FGB 01/22/2002 07:32GMT | AA03332 SN1047 Service Mod. 01/22/2002 07:34GMT | AA03333 SN1043 Lab 01/24/2002 09:15GMT | AA03334 09/28/1906 Airlock 2/20/02@ 22:14GMT | AA03335 S/N 1016 Airlock 2/22/02@ 07:28GMT | AA03336 SN1036 Lab 3/7/02@ 12:28GMT | AA03337 SN1032 FGB 3/7/02@ 12:29GMT | AA03338 SN1002 Service Mod. 3/7/02@ 12:30GMT | AA03339 S/N 1073 Node 1 4/2/02@ 10:37GMT | AA03340 S/N 1040 Node 1 4/2/02@ 13:40GMT |
| TARGET COMPOUNDS (TO-14/POLAR)*** | | | | | | | | | | | | | | |
| FREON 12 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 |
| CHLOROMETHANE | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 | 0.00061 |
| FREON 114 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| METHANOL | 0.06973 | 0.06390 | 0.07846 | 0.09462 | 0.09957 | 0.09564 | 0.09753 | 0.07962 | 0.08661 | 0.07613 | 0.07759 | 0.07642 | 0.05662 | 0.03275 |
| ACETALDEHYDE | 0.05019 | 0.05104 | 0.05268 | 0.04536 | 0.04115 | 0.05128 | 0.03441 | 0.16526 | 0.03287 | 0.03768 | 0.04798 | 0.05060 | 0.04178 | 0.04008 |
| VINYL CHLORIDE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BROMOMETHANE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ETHANOL | 0.00181 | 0.00165 | 0.00164 | 0.00235 | 0.00137 | 0.00130 | 0.00138 | 0.00166 | 0.00153 | 0.00145 | 0.00138 | 0.00136 | 0.00124 | 0.00124 |
| CHLOROETHANE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ACETONITRILE | ND | ND | ND | ND | ND | 0.00373 | 0.00373 | 0.00373 | 0.00373 | 0.00373 | 0.00373 | 0.00373 | 0.00373 | 0.00373 |
| PROPENAL | ND | ND | ND | ND | ND | ND | ND | 0.33333 | ND | ND | ND | ND | ND | ND |
| ACETONE | 0.00604 | 0.00808 | 0.00578 | 0.00563 | 0.00428 | 0.00495 | 0.00362 | 0.01511 | 0.00395 | 0.00276 | 0.00274 | 0.00359 | 0.00231 | 0.00358 |
| PROPANAL | 0.00694 | 0.00694 | 0.00694 | 0.00694 | 0.00694 | 0.00694 | 0.00694 | 0.03376 | 0.00694 | 0.00694 | 0.00694 | 0.00694 | 0.00694 | 0.00694 |
| 2-PROPANOL | 0.00174 | 0.00123 | 0.00145 | 0.00215 | 0.00121 | 0.00152 | 0.00228 | 0.00416 | 0.00197 | 0.00103 | 0.00077 | 0.00099 | 0.00060 | 0.00088 |
| FREON 11 | ND | ND | ND | 0.00003 | ND | ND | ND | 0.00003 | 0.00003 | ND | ND | 0.00003 | 0.00003 | 0.00003 |
| FURAN | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ACRYLONITRILE | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 | 0.00893 |
| PENTANE | ND | ND | ND | ND | ND | ND | ND | 0.00004 | ND | ND | ND | ND | ND | ND |
| 2-METHYL-2-PROPANOL | 0.00021 | 0.00021 | 0.00021 | 0.00021 | ND | 0.00021 | ND | 0.00186 | 0.00021 | ND | ND | ND | ND | 0.00021 |
| METHYL ACETATE | ND | ND | 0.00021 | ND | ND | ND | ND | 0.00021 | ND | ND | ND | ND | ND | ND |
| 1,1-DICHLOROETHENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| DICHLOROMETHANE | 0.01666 | 0.01359 | 0.01259 | 0.02556 | 0.01959 | 0.01898 | 0.02012 | 0.01732 | 0.02652 | 0.01774 | 0.01454 | 0.01671 | 0.01561 | 0.01728 |
| 3-CHLOROPROPENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| FREON 113 | ND | ND | ND | ND | ND | ND | ND | 0.00006 | ND | ND | ND | ND | ND | 0.00006 |
| N-PROPANOL | 0.00067 | 0.01879 | 0.00060 | 0.00087 | 0.00026 | 0.00057 | 0.00026 | 0.00415 | 0.00053 | 0.00026 | 0.00026 | 0.00026 | 0.00026 | 0.00026 |
| 1,1-DICHLOROETHANE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BUTANAL | 0.00568 | 0.00568 | 0.00568 | 0.00568 | 0.00568 | 0.00568 | 0.00568 | 0.04430 | 0.00568 | 0.00568 | 0.00568 | 0.00568 | 0.00568 | 0.00568 |
| 2-BUTANONE | 0.00083 | 0.00083 | 0.00083 | 0.00083 | 0.00083 | 0.00083 | 0.00083 | 0.00406 | 0.00083 | 0.00083 | 0.00083 | 0.00083 | 0.00083 | 0.00083 |
| 1,2-DICHLOROETHENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-METHYLFURAN | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ETHYL ACETATE | 0.00036 | 0.00036 | 0.00033 | 0.00030 | 0.00014 | 0.00014 | 0.00014 | 0.00106 | 0.00014 | 0.00014 | 0.00014 | 0.00014 | 0.00014 | 0.00014 |
| HEXANE | ND | ND | ND | ND | ND | ND | ND | 0.00014 | ND | ND | ND | ND | ND | ND |
| CHLOROFORM | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-BUTENAL | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,2-DICHLOROETHANE | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 | 0.02500 |
| 1,1,1-TRICHLOROETHANE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| N-BUTANOL | 0.00453 | 0.02269 | 0.00448 | 0.00586 | 0.00324 | 0.00396 | 0.00280 | 0.18631 | 0.00736 | 0.00278 | 0.00263 | 0.00342 | 0.00224 | 0.00236 |
| BENZENE | ND | ND | ND | ND | ND | ND | ND | 0.60115 | 0.12500 | ND | ND | ND | ND | 0.12500 |
| CARBON TETRACHLORIDE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-PENTANONE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | 0.00036 | 0.00036 |
| PENTANAL | 0.00472 | 0.00472 | 0.00472 | 0.00472 | 0.00472 | 0.00472 | 0.00472 | 0.01796 | 0.00472 | 0.00472 | 0.00472 | 0.00472 | 0.00472 | 0.00472 |
| 1,2-DICHLOROPROPANE | ND | ND | ND | 0.00060 | ND | ND | ND | 0.00060 | 0.00060 | ND | ND | ND | ND | ND |
| 1,4-DIOXANE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| TRICHLOROETHENE | ND | ND | ND | ND | ND | ND | ND | 0.00250 | ND | ND | ND | ND | ND | ND |
| 2,5-DIMETHYLFURAN | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 4-METHYL-2-PENTANONE | 0.00018 | 0.00018 | 0.00018 | 0.00018 | ND | 0.00018 | ND | 0.00151 | 0.00018 | 0.00018 | ND | ND | ND | 0.00018 |
| CIS-1,3-DICHLOROPROPENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 2-PENTENAL | ND | ND | 0.01190 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| TRANS-1,3-DICHLOROPROPENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,1,2-TRICHLOROETHANE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

TABLE 2B
ANALYTICAL RESULTS OF
ISS 8ACONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | T-VALUE (180-d SMAC) | | | | | | | | | | | | | |
|---------------------------|--|--|---|--|--|---|--|--|--|---|---|--|--|--|
| | AA03327 SN1019 Lab 12/27/2001 08:21GMT | AA03328 SN1062 FGB 12/27/2001 08:23GMT | AA03329 SN1049 Service Mod. 12/27/2001 08:24GMT | AA03330 SN1025 Lab 01/22/2002 07:30GMT | AA03331 SN1051 FGB 01/22/2002 07:32GMT | AA03332 SN1047 Service Mod. 01/22/2002 07:34GMT | AA03333 SN1043 Lab 01/24/2002 09:15GMT | AA03334 09/28/1906 Airlock 2/20/02@ 22:14GMT | AA03335 S/N 1016 Airlock 2/22/02@ 07:28GMT | AA03336 SN1036 Lab 3/7/02@ 12:28GMT | AA03337 SN1032 FGB 3/7/02@ 12:29GMT | AA03338 SN1002 Service Mod. 3/7/02@ 12:30GMT | AA03339 S/N 1073 Node 1 4/2/02@ 10:37GMT | AA03340 S/N 1040 Node 1 4/2/02@ 13:40GMT |
| TOLUENE | 0.00098 | 0.00091 | 0.00092 | 0.00085 | 0.00042 | 0.00042 | 0.00042 | 0.05075 | 0.00215 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 |
| HEXANAL | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 | 0.00410 |
| MESITYL OXIDE | ND | 0.00257 | ND | ND | ND | ND | ND | 0.00063 | ND | ND | ND | ND | ND | ND |
| 1,2-DIBROMOETHANE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| BUTYL ACETATE | 0.00013 | 0.00013 | 0.00013 | 0.00013 | 0.00013 | 0.00013 | 0.00013 | 0.00380 | 0.00013 | 0.00013 | 0.00013 | 0.00013 | 0.00013 | 0.00013 |
| TETRACHLOROETHENE | ND | ND | ND | ND | ND | ND | ND | 0.00450 | ND | ND | ND | ND | ND | ND |
| CHLOROBENZENE | ND | ND | 0.00054 | ND | ND | 0.00054 | ND | 0.00470 | 0.00054 | ND | ND | ND | ND | ND |
| ETHYL BENZENE | 0.00050 | 0.00050 | 0.00050 | 0.00050 | 0.00050 | 0.00050 | 0.00050 | 0.00689 | 0.00050 | 0.00050 | 0.00050 | 0.00050 | 0.00050 | 0.00050 |
| M- + P-XYLENES | 0.00023 | 0.00025 | 0.00026 | 0.00011 | 0.00011 | 0.00011 | 0.00011 | 0.00606 | 0.00025 | 0.00011 | 0.00011 | 0.00011 | 0.00011 | 0.00011 |
| 2-HEPTANONE | 0.00109 | ND | 0.00109 | ND | ND | 0.00109 | ND | 0.00109 | 0.00109 | 0.00109 | ND | ND | ND | 0.00109 |
| CYCLOHEXANONE | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 | 0.00042 |
| HEPTANAL | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 | 0.00357 |
| STYRENE | ND | ND | ND | ND | ND | ND | ND | 0.00058 | ND | ND | ND | ND | ND | ND |
| 1,1,2,2-TETRACHLOROETHANE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| O-XYLENE | 0.00044 | 0.00046 | 0.00051 | 0.00037 | 0.00035 | 0.00038 | 0.00026 | 0.01067 | 0.00041 | 0.00011 | 0.00026 | 0.00030 | 0.00110 | 0.00103 |
| 1,3,5-TRIMETHYLBENZENE | ND | ND | ND | ND | ND | ND | ND | 0.00167 | ND | ND | ND | ND | ND | ND |
| 1,2,4-TRIMETHYLBENZENE | ND | ND | ND | ND | ND | ND | ND | 0.00167 | ND | ND | ND | ND | ND | ND |
| 1,3-DICHLOROBENZENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| 1,4-DICHLOROBENZENE | ND | ND | ND | ND | ND | ND | ND | 0.00083 | ND | ND | ND | ND | ND | ND |
| 1,2-DICHLOROBENZENE | ND | ND | ND | ND | ND | ND | ND | 0.00083 | ND | ND | ND | ND | ND | ND |
| 1,2,4-TRICHLOROBENZENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| HEXACHLORO-1,3-BUTADIENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |

| | | | | | | | | | | | | | | |
|-----------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| TARGET COMPOUNDS (TOXIC) | | | | | | | | | | | | | | |
| 1,3-BUTADIENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| ETHYLENE OXIDE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CARBON DISULFIDE | 0.00156 | 0.00156 | 0.00156 | 0.00156 | ND | ND | 0.00156 | 0.00156 | 0.00156 | ND | 0.00156 | ND | 0.00156 | 0.00156 |
| 2-METHYL-2-PROPENAL | 0.01471 | 0.01471 | ND | ND | ND | 0.01471 | ND | 0.01471 | 0.01471 | ND | ND | ND | ND | 0.01471 |
| 3-BUTEN-2-ONE | ND | 0.05814 | ND | ND | ND | ND | ND | 0.05814 | 0.05814 | ND | ND | ND | ND | ND |
| 2-ETHOXYETHANOL | ND | ND | ND | ND | ND | ND | ND | 0.08333 | ND | ND | ND | ND | ND | ND |
| DIMETHYLDISULFIDE | 0.12500 | 0.12500 | 0.12500 | ND | 0.12500 | 0.12500 | 0.12500 | 0.12500 | ND | ND | ND | ND | ND | ND |
| OCTAMETHYLCYCLOTETRAILOXANE | 0.31278 | 0.17047 | 0.04237 | 0.02779 | 0.02302 | 0.12288 | 0.04953 | 0.23972 | 0.33268 | 0.04300 | 0.27724 | 0.02928 | 0.01426 | 0.11004 |

| | | | | | | | | | | | | | | |
|-------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| NON-TARGET COMPOUNDS | | | | | | | | | | | | | | |
| OCTAFLUOROPROPANE | 0.00327 | 0.00355 | 0.00312 | 0.00203 | 0.00220 | 0.00258 | 0.00161 | 0.00134 | 0.00132 | 0.00086 | 0.00093 | 0.00086 | 0.00093 | 0.00082 |
| BROMOTRIFLUOROMETHANE | 0.00001 | 0.00001 | 0.00001 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | BL | BL | BL | BL | BL |
| 1-PROPENE | 0.00006 | 0.00006 | 0.00005 | 0.00010 | 0.00008 | 0.00009 | 0.00008 | 0.00009 | 0.00005 | 0.00002 | 0.00002 | 0.00003 | 0.00001 | 0.00001 |
| CARBONYL SULFIDE | 0.00019 | 0.00021 | 0.00015 | 0.00020 | 0.00012 | 0.00014 | 0.00017 | 0.00008 | 0.00017 | 0.00013 | 0.00014 | 0.00015 | 0.00018 | 0.00013 |
| 2-METHYLPROPANE | 0.00001 | 0.00001 | BL | 0.00001 | 0.00001 | 0.00001 | 0.00001 | 0.00041 | 0.00006 | 0.00001 | 0.00001 | 0.00001 | 0.00005 | 0.00319 |
| FLUOROTRIMETHYLSILANE | 0.05211 | 0.02991 | 0.02534 | 0.05219 | 0.02919 | 0.02443 | 0.02466 | 1.29464 | 0.08637 | BL | BL | BL | BL | 0.08904 |
| 2-METHYL PROPANAL | 0.00030 | BL | BL | BL | BL | 0.00044 | 0.00000 | 0.00407 | 0.00056 | BL | 0.00024 | BL | BL | 0.00041 |
| TRIMETHYLSILANOL | 0.00437 | 0.00245 | 0.00237 | 0.00378 | 0.00182 | 0.00192 | 0.00300 | 0.00807 | 0.00439 | 0.00268 | 0.00154 | 0.00145 | 0.00234 | 0.00299 |
| 2-METHYL 2-PROPENITRILE | 0.00404 | 0.00481 | 0.00412 | 0.00390 | 0.00279 | 0.00343 | 0.00259 | 0.00474 | 0.00105 | BL | 0.00226 | 0.00230 | BL | 0.00160 |
| 1,3-DIOXOLANE | 0.00071 | 0.00050 | 0.00047 | 0.00088 | 0.00039 | 0.00040 | 0.00049 | 0.00075 | 0.00128 | 0.00055 | 0.00039 | 0.00049 | 0.00080 | 0.00064 |
| 2-METHYLPROPANENITRILE | 0.00112 | 0.00082 | 0.00081 | 0.00087 | 0.00067 | 0.00074 | 0.00059 | 0.00154 | 0.00053 | 0.00043 | 0.00044 | 0.00055 | 0.00049 | 0.00059 |
| C7-ALKANE | 0.00000 | 0.00000 | BL | BL | BL | BL | BL | 0.00025 | BL | BL | BL | BL | BL | BL |
| C7-ALKANE | 0.00002 | 0.00002 | 0.00002 | 0.00002 | 0.00001 | 0.00001 | 0.00001 | 0.00113 | 0.00003 | BL | 0.00000 | BL | BL | BL |
| C7-ALKANE | 0.00009 | 0.00008 | 0.00008 | 0.00006 | 0.00005 | 0.00007 | 0.00004 | 0.00357 | 0.00015 | 0.00004 | 0.00003 | 0.00004 | 0.00003 | 0.00006 |
| C7-ALKANE | 0.00004 | 0.00003 | 0.00003 | 0.00003 | 0.00002 | 0.00002 | 0.00002 | 0.00218 | 0.00007 | 0.00001 | 0.00001 | 0.00001 | 0.00001 | 0.00001 |
| C7-ALKANE | 0.00009 | 0.00008 | 0.00007 | 0.00006 | 0.00004 | 0.00005 | 0.00004 | 0.00444 | 0.00015 | 0.00002 | 0.00002 | 0.00002 | 0.00002 | 0.00003 |
| UNKNOWN ALCOHOL | 0.03631 | 0.02615 | 0.02651 | 0.04507 | 0.02591 | 0.02647 | 0.03127 | 0.95086 | 0.06059 | 0.02816 | 0.02281 | 0.02706 | 0.02702 | 0.02680 |

TABLE 2B
ANALYTICAL RESULTS OF
ISS 8ACONTAINER AIR SAMPLES

| CHEMICAL CONTAMINANT | T-VALUE (180-d SMAC) | | | | | | | | | | | | | |
|------------------------------|--|--|---|--|--|---|--|--|--|---|---|--|--|--|
| | AA03327 SN1019 Lab 12/27/2001 08:21GMT | AA03328 SN1062 FGB 12/27/2001 08:23GMT | AA03329 SN1049 Service Mod. 12/27/2001 08:24GMT | AA03330 SN1025 Lab 01/22/2002 07:30GMT | AA03331 SN1051 FGB 01/22/2002 07:32GMT | AA03332 SN1047 Service Mod. 01/22/2002 07:34GMT | AA03333 SN1043 Lab 01/24/2002 09:15GMT | AA03334 09/28/1906 Airlock 2/20/02@ 22:14GMT | AA03335 S/N 1016 Airlock 2/22/02@ 07:28GMT | AA03336 SN1036 Lab 3/7/02@ 12:28GMT | AA03337 SN1032 FGB 3/7/02@ 12:29GMT | AA03338 SN1002 Service Mod. 3/7/02@ 12:30GMT | AA03339 S/N 1073 Node 1 4/2/02@ 10:37GMT | AA03340 S/N 1040 Node 1 4/2/02@ 13:40GMT |
| HEXAMETHYLDISILOXANE | 0.00009 | 0.00013 | BL | BL | BL | BL | BL | 0.00301 | 0.00010 | BL | BL | BL | BL | BL |
| C7-ALKANE | 0.00002 | 0.00002 | 0.00002 | 0.00001 | 0.00001 | 0.00001 | 0.00001 | 0.00154 | 0.00004 | 0.00000 | 0.00000 | 0.00000 | 0.00001 | 0.00001 |
| DIMETHYLCYCLOPENTANE ISOMER | 0.00002 | 0.00002 | 0.00001 | 0.00001 | BL | BL | BL | 0.00144 | 0.00004 | BL | BL | BL | 0.00002 | BL |
| PROPANOIC ACID, ETHYL ESTER | 0.00002 | 0.00002 | 0.00002 | 0.00002 | 0.00001 | 0.00001 | 0.00001 | 0.00079 | 0.00003 | BL | BL | BL | BL | BL |
| DIMETHYLCYCLOPENTANE ISOMER | 0.00008 | 0.00007 | 0.00006 | 0.00006 | 0.00004 | 0.00004 | 0.00004 | 0.00434 | 0.00012 | BL | BL | BL | BL | 0.00002 |
| ACETIC ACID, PROPYL ESTER | 0.00000 | 0.00003 | BL | BL | BL | BL | BL | 0.00040 | 0.00002 | BL | BL | BL | BL | BL |
| HEPTANE | 0.00007 | 0.00006 | 0.00005 | 0.00004 | 0.00003 | 0.00003 | 0.00003 | 0.00374 | 0.00011 | 0.00001 | 0.00001 | 0.00001 | 0.00001 | 0.00002 |
| FORMIC ACID, BUTYL ESTER | BL | 0.00005 | BL | BL | BL | BL | BL | 0.00141 | 0.00004 | BL | BL | BL | BL | BL |
| METHYLCYCLOHEXANE | 0.00007 | 0.00006 | 0.00005 | 0.00004 | 0.00003 | 0.00003 | 0.00003 | 0.00379 | 0.00016 | BL | BL | 0.00001 | 0.00001 | 0.00002 |
| C8-ALKANE | 0.00000 | 0.00000 | 0.00000 | BL | BL | BL | BL | 0.00025 | 0.00001 | BL | BL | BL | BL | 0.00000 |
| ETHYLCYCLOPENTANE | 0.00002 | 0.00001 | 0.00001 | BL | BL | BL | BL | 0.00158 | 0.00004 | BL | BL | BL | BL | BL |
| C8-ALKANE | BL | BL | BL | BL | BL | BL | BL | 0.00014 | 0.00000 | BL | BL | BL | BL | BL |
| C3-SUBSTITUTED CYCLOPENTANE | BL | BL | BL | BL | BL | BL | BL | 0.00129 | 0.00003 | BL | BL | BL | BL | BL |
| CARBONIC ACID, DIETHYL ESTER | 0.00013 | 0.00010 | 0.00012 | 0.00018 | 0.00010 | 0.00011 | 0.00013 | 0.00923 | 0.00036 | 0.00013 | 0.00011 | 0.00012 | 0.00013 | 0.00010 |
| C8-ALKANE | 0.00001 | 0.00001 | 0.00001 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00050 | 0.00002 | 0.00000 | 0.00000 | 0.00000 | 0.00001 | 0.00001 |
| C8-ALKANE | 0.00001 | 0.00001 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00034 | 0.00001 | BL | BL | BL | 0.00000 | 0.00000 |
| C8-ALKANE | 0.00002 | 0.00001 | 0.00001 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00066 | 0.00002 | 0.00000 | 0.00000 | BL | 0.00001 | 0.00001 |
| PENTAMETHYLDISILOXANE-1-OL | 0.00004 | BL | 0.00002 | 0.00008 | 0.00003 | BL | 0.00007 | 0.00012 | 0.00004 | 0.00002 | 0.00001 | 0.00002 | 0.00003 | BL |
| C8-ALKANE | 0.00001 | 0.00001 | 0.00001 | 0.00000 | 0.00000 | BL | 0.00000 | 0.00040 | 0.00001 | BL | BL | BL | BL | BL |
| BUTANOIC ACID, ETHYL ESTER | 0.00006 | 0.00006 | 0.00006 | 0.00005 | 0.00003 | 0.00004 | 0.00003 | 0.00176 | 0.00006 | 0.00001 | 0.00002 | 0.00002 | 0.00003 | 0.00003 |
| OCTANE | 0.00001 | 0.00001 | 0.00001 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00020 | 0.00001 | 0.00000 | 0.00000 | 0.00000 | 0.00000 | 0.00000 |
| C7-OXYGENATED HYDROCARBON | BL | BL | BL | BL | BL | BL | BL | 0.33213 | 0.00523 | BL | BL | BL | BL | BL |
| HEXAMETHYLCYCLOTRISILOXANE | 0.48621 | 0.05390 | 0.10625 | 0.05552 | 0.05589 | 0.23474 | 0.14896 | 0.42971 | 0.40110 | 0.11462 | 0.36427 | 0.07767 | 0.03937 | 0.20906 |
| BENZALDEHYDE | 0.00008 | 0.00007 | 0.00008 | 0.00004 | 0.00004 | 0.00007 | 0.00004 | 0.00107 | 0.00008 | 0.00005 | 0.00006 | 0.00005 | 0.00003 | 0.00005 |
| A-PINENE | 0.00003 | 0.00002 | 0.00003 | 0.00002 | 0.00002 | 0.00002 | 0.00002 | 0.00064 | 0.00003 | 0.00001 | 0.00001 | 0.00001 | 0.00002 | 0.00003 |
| C4-SUBSTITUTED BENZENE | 0.00078 | 0.00079 | 0.00080 | 0.00065 | 0.00057 | 0.00071 | 0.00052 | 0.00438 | 0.00041 | 0.00029 | 0.00034 | 0.00040 | 0.00020 | 0.00020 |
| LIMONENE | 0.00002 | 0.00002 | 0.00002 | 0.00007 | 0.00008 | 0.00010 | 0.00004 | 0.00027 | 0.00004 | 0.00007 | 0.00006 | 0.00007 | 0.00002 | 0.00002 |
| DECAMETHYLCYCLOPENTASILOXANE | 0.04076 | 0.00090 | 0.01301 | 0.02962 | 0.01915 | 0.02648 | 0.02471 | 0.04017 | 0.03639 | 0.01153 | 0.03076 | 0.01092 | 0.00650 | 0.01180 |
| TARGET COMPOUNDS (GC)*** | | | | | | | | | | | | | | |
| ETHYLENE | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND |
| CARBON MONOXIDE | 0.05000 | ND | ND | 0.05000 | 0.05000 | ND | ND | 0.14545 | 0.05000 | 0.05000 | ND | ND | 0.05000 | 0.05000 |
| METHANE | 0.01500 | 0.01500 | 0.01500 | 0.03947 | 0.03947 | 0.03947 | 0.03947 | 0.06316 | 0.03158 | 0.00474 | 0.00526 | 0.00526 | 0.00368 | 0.00368 |
| HYDROGEN | 0.01294 | 0.01235 | 0.01265 | 0.01382 | 0.01412 | 0.01441 | 0.01412 | 0.00794 | 0.00294 | 0.00235 | 0.00235 | 0.00235 | 0.00235 | 0.00235 |
| CARBON DIOXIDE | 0.57692 | 0.52308 | 0.56923 | 0.60000 | 0.56154 | 0.53846 | 0.58462 | 1.07692 | 0.60000 | 0.64615 | 0.57692 | 0.64615 | 0.56154 | 0.68462 |
| TOTAL T-VALUE | 1.95655 | 1.29278 | 1.18495 | 1.17484 | 1.18566 | 1.42460 | 1.30009 | 6.59662 | 2.05005 | 1.11298 | 1.50184 | 1.02487 | 0.89973 | 1.50695 |